

THE CLAIMS OF THE INVENTION ARE AS FOLLOWS:-

1. A polymeric ultra or microfiltration membrane incorporating PVME.
2. A polymeric ultra or microfiltration membrane according to claim 1 wherein the
5 PVME is present as a coating on the membrane.
3. A polymeric ultra or microfiltration membrane according to claim 1 wherein the
PVME is present as a coating on the membrane and is incorporated in the membrane as a
homogeneous dispersion throughout the membrane.
4. A polymeric ultra or microfiltration membrane according to claim 1 wherein the
10 PVME is incorporated in the membrane as a homogeneous dispersion throughout the
membrane.
5. A polymeric ultra or microfiltration membrane according to claim 1 wherein the
PVME is incorporated in the membrane as a heterogeneous dispersion throughout the
membrane.
- 15 6. A membrane according to any one of the preceding claims wherein the polymeric
ultra or microfiltration membrane includes one or more of Halar, PVDF or PP.
7. A membrane according to any one of the preceding claims which is hydrophilic.
8. A membrane according to any one of the preceding claims which has a highly
asymmetric structure.
- 20 9. A membrane according to any one of the preceding claims having reduced pore
size as a result of the addition of PVME.
10. A membrane according to any one of the preceding claims substantially free from
macrovoids.
11. A membrane according to any one of the preceding claims containing cross
25 linked PVME.

- 12 A polymeric ultra or microfiltration membrane incorporating adsorbed PVME and embedded PVME and wherein adsorbed PVME is cross-linked with embedded PVME.
13. A polymeric ultra or microfiltration membrane according to any one of the
5 preceding claims containing PVDF and PVME in a ratio of 0.1:24 to 0.5 to 24.
14. A polymeric ultra or microfiltration membrane according to any one of the preceding claims consisting of Halar and PVME in a ratio of 0.5:18 to 1:18.
15. A polymeric ultra or microfiltration membrane according to any one of the preceding claims containing PVDF and PVME in a ratio of 0.4:13 to 2.3:13.
- 10 16 A polymeric ultra or microfiltration membrane according to any one of the preceding claims containing 0.4 to 30 wt% PVME.
17. A polymeric ultra or microfiltration according to any one of the preceding claims which on soaking for 8 hours produces a detectable quantity of PVME.
18. A polymeric ultra or microfiltration membrane according to any one of the
15 preceding claims containing PVME which on soaking for 48 hours produces a leachate having at least 5ppm PVME.
19. A hydrophobic polymeric ultra or microfiltration membrane according to any one of the preceding claims rendered hydrophilic by contacting the membrane with an aqueous or alcoholic solution of PVME with a concentration 0.05 to 5 wt%.
- 20 20. A hydrophobic polymeric ultra or microfiltration membrane according to any one of the preceding claims rendered hydrophilic by contacting the membrane with an aqueous or alcoholic solution of PVME with a concentration of 0.05 to 5 wt%, at a pressure of 0.5 to 50 bar.

21. A method of hydrophilising a membrane prepared from a polymeric material, said method including the step of contacting said polymeric material with a compatible at least partially water soluble polymeric hydrophilising agent.
22. A method according to claim 21 wherein the at least partially water soluble
5 polymeric hydrophilising agent is soluble in an amount of at least 5-10g/l at standard temperature and pressure.
23. A method according to claim 21 or 22 wherein the at least partially water soluble polymeric hydrophilising agent contains vinylmethyl ether monomers.
24. A method according to claim any one of claims 21-23 wherein the polymeric
10 hydrophilising agent is polyvinylmethyl ether (PVME).
25. A method according to any one of claims 21-24 wherein the polymeric hydrophilising agent is a copolymer containing vinylmethyl ether monomer and at least one other co-monomer.
26. A method according to claim 25 wherein the vinylmethyl ether monomer is
15 present in an amount of at least 50 mole% of the polymeric hydrophilising agent.
27. A method according to claim 25 or claim 26 wherein the co-monomer is selected from the group consisting of: co-polymerisable acrylate monomers and co-polymerisable vinyl monomers.
28. A method according to claim 27 wherein the co-monomer is selected from the
20 group consisting of: vinyl acetate, acrylic acid, methyl acrylate, methyl methacrylate, allyl methacrylate, ethyl acrylate, ethyl methacrylate, methacrylic acid, fumaric acid, monoesters of fumaric acid, diesters of fumaric acid, maleic acid, monoesters of maleic acid, diesters maleic acid, diallyl maleate maleic anhydride, esters of adipic acid (divinyl adipate), ethylenically unsaturated carboxamides (acrylamide), ethylenically unsaturated
25 carbo-nitriles (acrylonitrile), ethylenically unsaturated sulfonic acids (vinylsulfonic acid).

29. A method of modifying the hydrophobic/hydrophilic balance of a polymer membrane prepared from a polymeric material, said method including the step of contacting said polymeric material with polyvinylmethyl ether (PVME) to produce a modified polymeric membrane.
- 5 30. A method according to claim 29 wherein the polymeric membrane is coated with PVME.
31. A method according to claim 29 or 30 wherein the polymeric membrane is an ultrafiltration membrane or a microfiltration membrane
32. A method according to any one of claims 29-31 wherein the polymeric material
10 is a hydrophobic polymer and hydrophobic/hydrophilic balance of the polymer is modified to provide a hydrophilic modified polymeric membrane.
33. A method according to any one of claims 29 to 32 wherein the polymeric material is poly(vinylidene fluoride) (PVDF), poly(ethylene-chlorotrifluoroethylene) (Halar) and poly(propylene) (PP) or mixtures thereof.
- 15 34. A method according to claim 33 wherein the polymeric material is poly(vinylidene fluoride) (PVDF) or poly(ethylene-chlorotrifluoroethylene) (Halar).
35. A method according to any one of claims 29 to 34 wherein the polymeric material is a formed membrane treated with a solution of PVME at a concentration and for a time sufficient to allow PVME saturation of said membrane to take place.
- 20 36. A method according to claim 35 wherein the polymeric material is post treated by soaking in a solution of PVME in ethanol.
37. A method according to claim 35 wherein the polymeric material is post treated by soaking in a solution of PVME in water.
38. A method according to any one of claims 29 to 37 wherein the concentration of
25 PVME is less than 10%.

39. A method according to claim 38 wherein the concentration of PVME is less than 5%.
40. A method according to claim 39 wherein the concentration of PVME is less than the concentration of PVME is less than 3%.
- 5 41. A method according to claim 40 wherein the concentration of PVME is greater than 0.1%.
42. A method according to any one of claims 29-37 wherein the concentration of PVME is 1 to 5%.
43. A method according to claim 35-42 wherein treatment with PVME takes place
10 for between 5 minutes and 16 hours.
44. A method according to claim 43 wherein treatment with a solution of PVME is followed by a rinsing stage to remove unbound PVME.
45. A method according to any one of claims 29 to 44 wherein the polymeric material is treated with PVME by means of adding PVME to a membrane dope prior to
15 casting.
46. A method according to claim 45 wherein the membrane dope is cast via a thermally induced phase separation process.
47. A method according to claim 46 wherein the membrane dope includes PVME in an amount up to 1wt%.
- 20 48. A method according to claim 45 wherein the membrane dope is cast via a diffusion induced phase separation process.
49. A method according to claim 48 wherein the membrane dope includes PVME in an amount higher than 1wt%.
50. A method according to claim 48 or 49 wherein the PVME is dissolved in a
25 polymer dope/solvent/non-solvent mixture.

51. A method according to claim 50 wherein the solvent/non-solvent mixture includes a PVME solvent and PVME non-solvent.
52. A method according to claim 50 or 51 wherein the PVME solvent possesses weak polarity.
- 5 53. A method according to claim 52 wherein the PVME solvent is glyceroltriactate.
54. A method according to claim 50 or 51 wherein the PVME non-solvent is strongly polar.
55. A method according to claim 53 wherein the PVME non-solvent is diethylene glycol, triethylene glycol, 1,4-butanediol or mixtures thereof.
- 10 56. A method according to any one of claims 50 to 54 wherein the solvent mixture includes from 40-60% non-solvent.
57. A method according to claim 50 wherein the solvent mixture includes PVME in an amount of 0.1-2wt%.
58. A method according to claim 57 wherein the solvent mixture includes PVME in
15 an amount of 0.7-1wt%.
59. A method according to claim 46 wherein the method of casting is a TIPS process further including treatment with a coating solution.
60. A method according to claim 46 wherein the method of casting is a TIPS process further including treatment with a coating solution which contains a solvent and a non-
20 solvent.
61. A method according to claim 47 wherein the process is a DIPS process where N-methylpyrrolidone is present as a solvent, and water is present as non-solvent.
62. A method according to claim 21 wherein PVME is incorporated in the membrane dope and formed into a membrane, and wherein said membrane is further treated with
25 PVME.

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63. A method according to any one of the preceding claims wherein the membrane is treated to cross-link incorporated and/or adsorbed PVME.

64. A method according to claims 63 wherein the method of cross linking is e-beam irradiation.

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